Researchers' work translated into positive results for public health

By Keith Herrell and Joe Balintfy

An NIEHS-funded study of chemicals in the blood of 6-8 year-old girls in the Cincinnati-Northern Kentucky metropolitan area, also known as Greater Cincinnati, and San Francisco Bay area, collected between 2005 and 2009, showed a direct relationship between the duration of being breast and the children's blood levels of certain polyfluoroalkyl chemicals (PFCs). The study was published in the scientific journal Environmental Pollution.

PFCs are in a number of household products, and these chemicals can find their way into the water supply, eventually ending up in breast milk. Their health effects are still being studied, but other researchers have found serious concerns that include increased risk of cancer.

"This project represents a success story of research findings being translated to public health," said Susan Pinney, Ph.D. *(http://www.eh.uc.edu/dir_individual_details.asp?qcontactid=81)* professor of environmental health and deputy director of the Center for Environmental Genetics at the University of Cincinnati (UC).

Among the findings

- Granular activated carbon filtration can reduce PFOA exposure through drinking water sources.
- Reduction of PFOA exposure through drinking water treatment also reduces internal exposure in breast fed girls.

Pinney said it's especially rewarding when research points to effective strategies for primary prevention. (Photo courtesy of Cincinnati Children's Hospital Medical Center)

High levels of PFCs in Greater Cincinnati area

Early in the study, a preliminary list of chemicals to be tested was shared with Antonia Calafat, Ph.D., head of the Personal Care Products Laboratory at the Centers for Disease Control and Prevention (CDC), who suggested that PFCs and other relevant environmental chemicals be added to the list. It was subsequently discovered that about half of the girls in one particular area of Greater Cincinnati had significant concentrations of perfluorooctanoic acid (PFOA), a type of PFC, in their blood.

At that point, NIEHS, the National Cancer Institute (NCI), which co-funded the study, and CDC agreed to measure the blood concentration in all of the study participants from the Northern Kentucky area.

Study results lead to changes in water intake filtration

Using preliminary data from these measurements, in 2007, study investigators visited officials from the Greater Cincinnati Water Works (GCWW) and Northern Kentucky Water District (NKWD) to inform them of the findings. A meeting with the parents of study participants from Northern Kentucky was also held.

Over the next five years, the NKWD and GCWW considered the study results in determining the appropriate frequency for reactivating its granulated activated carbon filters. NKWD draws its water from the Ohio River and Licking River, while GCWW receives its water from the Ohio River and the Great Miami Aquifer.

Prior to publication of the study, the researchers again met with the leadership of the water departments, sharing findings that had been presented at the International Society for Environmental Epidemiology August meeting in Basel, Switzerland.

"The message is not that you shouldn't breast feed," Pinney said. "The message is that if we don't take care of getting these chemicals out of the water, not only are the persons themselves exposed, but the exposure carries through to children who are breast fed."

Second author Frank Biro, M.D., is director of research, adolescent and transition medicine, and professor in the UC Department of Pediatrics. (Photo courtesy of Cincinnati Children's Hospital Medical Center)

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